

Chemistry: Unit 1: Lab Safety & Techniques: Lab #1: Making Ice Cream

Introduction:

Chemistry is a big part of everyone's lives, even if they don't realize it. The art of making ice cream has been around for thousands of years, but never would have been possible without chemistry! A long time ago, someone realized that when you mix the right ingredients (chemicals) together, and lower the temperature, you get a great tasting frozen treat.

This lab shows several properties of matter that you will be learning about throughout the year, including phase shifts, temperature depression, solubility, and crystallization.

Materials:

1 quart freezer bags	1/4 cup sugar
1 gallon freezer bags	1/4 teaspoon vanilla flavoring (or 2 drops flavoring oil)
duct or packing tape	sodium chloride (NaCl) (preferably rock)
1/2 cup milk	solid H ₂ O
1/2 cup half and half	thermometer
measuring cups (1/2 and 1/4 cup)	bowls or cups
plastic spoons	

Procedure:

1. Into a 1 quart freezer bag, put 1/4 cup sugar, 1/2 cup milk, 1/2 cup half and half, and 1/4 teaspoon vanilla flavoring (or 2 drops of flavoring oil).
2. Securely seal the bag and place tape along the top to insure the seal.
3. Mix contents well.
4. Into a 1 gallon freezer bag, put 2 cups of solid H₂O. **Using the thermometer, measure and record the temperature of the solid H₂O.**
5. Add between 1/2 and 3/4 cups of sodium chloride (NaCl) to the gallon bag.
6. Put the sealed quart bag into the gallon bag and seal securely.
7. Holding the large bag by the top seal, gently rock the bag from side to side. *Do not hold the bag in your hands – it will be cold enough to cause tissue damage to your hands!* Continue rocking the bag until the contents of the inside bag have solidified (10-15 minutes).
8. **Measure the temperature of the NaCl/solid H₂O mixture in the gallon bag and record.**
9. **Determine the change in temperature and record it.**
10. Remove the frozen contents from the quart bag and enjoy your freshly made ice cream.

Questions: Answer the questions in your lab notebook.

1. What is NaCl? What is solid H₂O?
2. Why was the NaCl added to the solid H₂O?
3. What is the difference between ice cream and frozen custard?
4. Bonus: Why is making ice cream considered chemistry?

Conclusion:

1. What did you learn from this lab? What was the purpose of this lab?
2. What went well and why?
3. What did not go well and why?
4. What were your sources of error? What could you have done to minimize your sources of error?